APPENDIX C.4

METHOW ACCLIMATION FACILITIES

PROPOSED PLAN SITE DESCRIPTIONS AND CAPITAL COSTS

Yakama Nation Fisheries Resource Management

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I. *INTRODUCTION*

This report presents site information for proposed Mid-Columbia Coho Reintroduction Plan acclimation facilities that are located in the Methow watershed. A general discussion of the acclimation component of the MCCRP, information about the criteria used to select the acclimation systems and the specific sites, and brief descriptions of those sites are included in Appendix B.2 Acclimation Facilities Alternatives. More detailed site information and capital costs are presented in this appendix. Appendix C.3 describes proposed Wenatchee watershed acclimation facilities. The following is a list of master plan facility appendices, with this appendix highlighted.

A. FISH CULTURE GUIDELINES
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C. PROPOSED FACILITY PLAN DETAIL – SITE DESCRIPTIONS AND CAPITAL COSTS
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    C.4 METHOW ACCLIMATION FACILITIES
D. PROJECT SCHEDULE AND COSTS

Smolts are proposed to be released from a total of 9 locations in the Methow watershed. Three of these are also rearing sites: the Winthrop National Fish Hatchery (NFH); the Eightmile constructed habitat; and the Heath constructed habitat. These sites are described in Appendix C.2 Methow Rearing Facilities. Of the remaining 6, 5 have existing ponds that can be used. Two of the 6 sites require substantial amounts of construction.

The identification of back-up, or alternative, sites is critical. Many factors could result in a preferred location not being available for use. Alternatives to the proposed sites discussed below have been identified. These alternatives are listed in Appendix B.2.

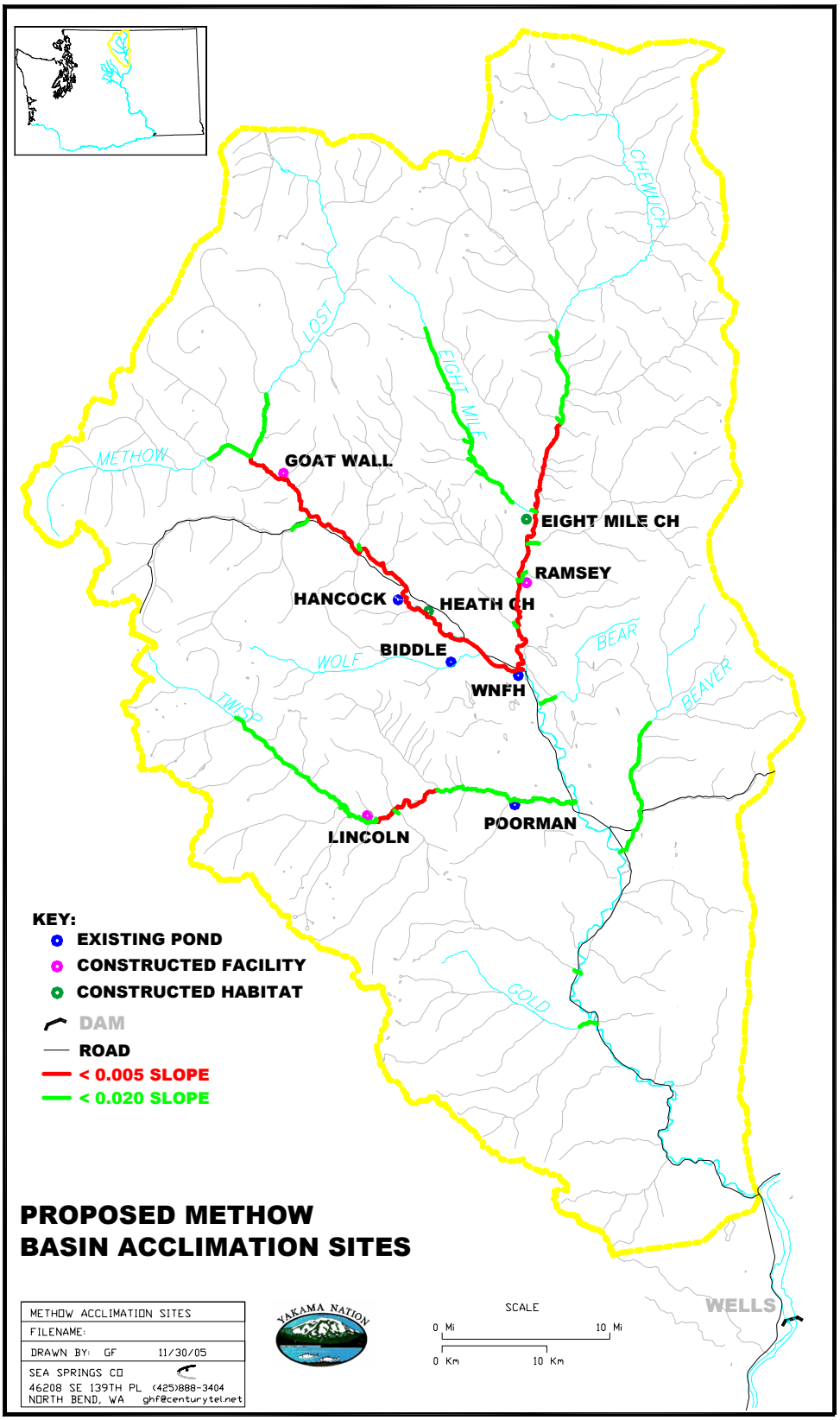

Figure 1. Site Map

II. *SITE DESCRIPTIONS*

A. General Information

Information about the location of the sites, their purpose, their type, their accessibility, and the presence of utilities is summarized in Table 1. In the location section, the tributary column lists the stream into which the acclimation ponds drain. River miles and elevation give a rough indication of the migratory difficulty for each proposed site.

The purpose section of the table provides some information about the proximity to habitat and about the main purpose of the site. Some locations function to release smolts so that returning adults are imprinted on spawning habitat that is located near the release site, some sites are used mainly for broodstock development, with returning adults collected at downstream locations; some sites are intended to spread adults widely within the targeted stream. The slope data for approximately one mile of stream below the release point is a rough approximation of the quality of nearby habitat. Slopes less than 0.5% have been identified on watershed maps as roughly approximating low-gradient habitat which is generally characterized as good for coho.

The site type section indicates whether ponds currently exist or must be constructed and the type of facility proposed. In all the following tables, the sites in red require significant amounts of construction, including construction of ponds and water supply systems at Lincoln and construction of both ponds and water systems at Goat Wall.

Table 1. General Information

	LOCATION						PURPOSE				SITE TYPE					OTHER	
	MAIN TRIBUTARY	RM TO MOUTH OF METHOW	TOWNSHIP	RANGE	SECTION	ELEVATION	LOCAL SPAWNING	BROOD DEVELOPMENT	WIDE ADULT DISTRIBUTION	DOWNSTREAM SLOPE (%)	WINTER USE	EXISTING NATURAL POND	EXISTING MANMADE POND	CONSTRUCTED POND	CONSTRUCTED HABITAT	PLOWED ACCESS	UTILITIES
Ramsey	Chewuck	57	35	21	11	1930			✓	0.57			✓			✓	✓
Poorman	Twisp	44	33	21	10	1730			✓	0.67	✓		✓			✓	✓
Lincoln	Twisp	56	33	20	16	2310	✓		✓	0.57	✓	✓				✓	✓
Biddle	Wolf	54	35	21	32	1920	✓	✓		2.40			✓			✓	✓
Hancock	Methow	59	35	20	15	1920	✓		✓	0.49	✓	✓				✓	
Goat Wall	Methow	68	34	17	7	2258	✓		✓	2.25	✓	✓				✓	

B. Water and Space

Minimum water requirements were calculated using a value of 6 pounds of fish per gallon/minute of flow, with an average release size of 18 fish per pound (see Appendix A Fish culture Guidelines, for more detail and references). This is an average minimum value based on approximate spring-time water temperatures and assumes saturated inflow. Flow rates should be higher than values indicated to provide a safety margin. Space requirements were calculated using 0.3 pounds of fish per cubic foot of water at sites with 24-hour security and 0.1 lbs/cft at other sites. The land requirement assumes that the water surface covers half of the site.

In Table 2, the section on the water supplies describes the type of water source and provides some flow data. These are preliminary measurements; more flow data will be collected in the future. In general, locations that have either gravity or pumped ground water supplies are capable of operating through the winter. Sites with intakes require a high degree of security to insure continuous water flow to the ponds.

Table 2. Water and Space

	REQUIREMENTS									WATER SUPPLY							SPACE
	PROPOSED RELEASE NUMBER	CURRENT CAPACITY	WATER NEEDED (CFS)	REARING SPACE RQRT (CFT)	WATER SURFACE RQRT (ACRES)	Number of Ponds	POND LENGTH	POND WIDTH	LAND SURFACE RQRT (ACRES)	WATER SOURCE	APRIL FLOW	GRAVITY, GROUND	GRAVITY, SURFACE	INTAKE REQUIRED	PUMPED, GROUND	PUMPED SURFACE	EXISTING POND SIZE (CFT)
Ramsey	125,000	185,000	2.6	23,000	0.2					Ramsey			✓				
Poorman	137,500	100,000	2.8	25,000	0.2					Ground		✓					
Lincoln	137,500		2.8	25,000	0.2					Twisp	Large		✓	✓		✓	36,000
Biddle	50,000	75,000	1.0	9,000	0.1					Wolf	2		✓	✓			10,000
Hancock	100,000	200,000	2.1	19,000	0.1					Springs	9	✓					
Goat Wall	50,000		1.0	9,000	0.1	1.0	94.9	31.6	0.1	Springs	Large	✓		✓		✓	

C. Environmental Conditions

Table 3 shows land use designations, ESA-listed fish species that might be near the sites, and other potential development risks for proposed Methow basin sites. These and other impacts will be evaluated in more detail during permit and decision processes, including the National Environmental Policy Act (NEPA) analysis.

Okanogan County zoning designations are defined as follows: RR, rural residential; VF, valley floor; MD, Methow review district. Riverine wetlands are associated with adjacent river systems and paulstrine are associated with small streams and marshes.

Check marks under the species listed in the Impacts column indicate that they are likely to be present near the intake or pond. The main impact to listed fish is barriers or intakes which impede migration around or through acclimation sites. Sites are designed to minimize these impacts, wherever possible.

The Development Risks section list some of the major issues that may prevent construction and/or operation of the sites and affect the facility development process. Development Risks include: local opposition during construction permit application; low flow volumes; water rights issues; waste discharge addressed through the National Pollutant Discharge Elimination System (NPDES) process; the availability (lease, purchase, or use agreement) of land; and access. A check mark in these columns signifies problematic issues identified during the preliminary analysis.

Table 3. Environmental Conditions

	LAND USE						ENV. IMPACTS				DEV. RISKS					
	ZONING	WETLAND DESIGNATION	FLOOD DESIGNATION	COMPREHENSIVE PLAN LAND USE	LAND USE	OWNERSHIP	MINIMAL FISH IMPACTS	BULL TROUT LIKELY	STEELHEAD LIKELY	SPRING CHINOOK LIKELY	LOCAL OPPOSITION	FLOW QUANTITIES	WATER RIGHTS	DISCHARGE IMPACTS	LAND OWNERSHIP	ACCESS
Ramsey	VF	Paulstrine	100 Yr	Ag	Rural residential	Private		✓	✓	✓	✓			✓	✓	
Poorman	VF	Paulstrine	100 Yr	Ag	Rural residential	Private	✓				✓			✓	✓	
Lincoln	VF	Riverine	100 Yr	None	Rural residential	Private		✓	✓	✓		✓	✓	✓		
Biddle	RR	None	None	Ag	Rural residential	Private	✓							✓		
Hancock	RR	Paulstrine	None	State	Pasture	Private		✓	✓	✓	✓			✓	✓	
Goat Wall	RR	Paulstrine	98 Yr	None	Rural residential	Private		✓	✓	✓	✓	✓	✓	✓	✓	

D. Additional Site Information

Water effluent treatment systems that are separate from acclimation ponds are not planned. Relatively small numbers of fish will be held at low densities in large ponds. The minimum retention time will be 2.5 hours and in most cases will be several times longer than this. Fish wastes will settle at low densities in the ponds and will be effectively treated during the long periods of time through the summer and fall when coho are not being acclimated. Most acclimation ponds developed for other species in the region do not include off-line effluent treatment systems.

Avian and mammalian predation is a major consideration for remote acclimation sites. At some locations, chain link fences and overhead bird netting will be installed. At other sites, electric fences and overhead wires could be used. Deterrence of predation through human presence has been used effectively at sites currently operated by the MCCRP as well as federal and state hatcheries and will be employed at locations where no structures are possible.

Many of the ponds at proposed sites could become inundated during floods, which normally occur in the spring during coho acclimation/migration periods. For that reason, the program would not prevent the unplanned release of fish due to flooding.

1. Existing Sites

- *Ramsey*. This large pond on private land is fed by Ramsey Creek water. The site is located in the middle of the low-gradient section of the Chewuch.
- *Poorman*. Large ponds are fed by spring water. Although parts freeze over, the site is likely to be functional in winter. This site will introduce smolts into the lower Twisp.
- *Hancock*. Recent Yakama Nation restoration projects have replaced a road culvert, improved fencing, added woody debris, and improved flow conditions in the spring channel. It is now much more accessible to salmonids and has habitat that should be very attractive to spawning coho. Fry that migrate out of the spring can rear in the Methow mainstem. Net enclosures in the existing ponds would allow the site to be used by other species during coho acclimation.
- *Biddle*. This site has been used in the past by the MCCRP. It has an intake and off-line pond. The intake needs to be improved to minimize impacts to other salmonids in Wolf Creek.

2. New Facilities

- *Lincoln*. Ponds currently exist on the Lincoln property. The ponds are adjacent to the Twisp River. An unscreened culvert provides river water to the ponds. The culvert elevation allows water flow only at moderate to high discharge.. A new intake that meets National Marine Fisheries Service (NMFS)/Washington Department of Fish and Wildlife (WDFW) screen criteria is required. Development of a pumped groundwater supply will provide water supply security and will allow winter operation. Existing vegetation will make placement of predator control fences difficult, but overhead nets can limit bird problems. This site puts coho into the upper portion of the low-gradient section of the Twisp.
- *Goat Wall*. A series of small ponds on private property are fed by springs at the base of Goat Wall. The ponds are valuable habitat and are not large enough to acclimate coho. As a result, it is proposed that a portion of the spring water be diverted into constructed ponds and that a new well be built to supplement the spring water. Adults produced from Goat Wall releases must migrate through a reach of the Methow River that frequently dewaters in late summer or early fall. However, releases from this site may encourage coho, when flow conditions allow, to return to the upper Methow above the dewatered area where quality coho habitat exists. Adult coho frequently migrate upstream during fall freshets which would provide passage in most years.

E. Conceptual Design Drawings

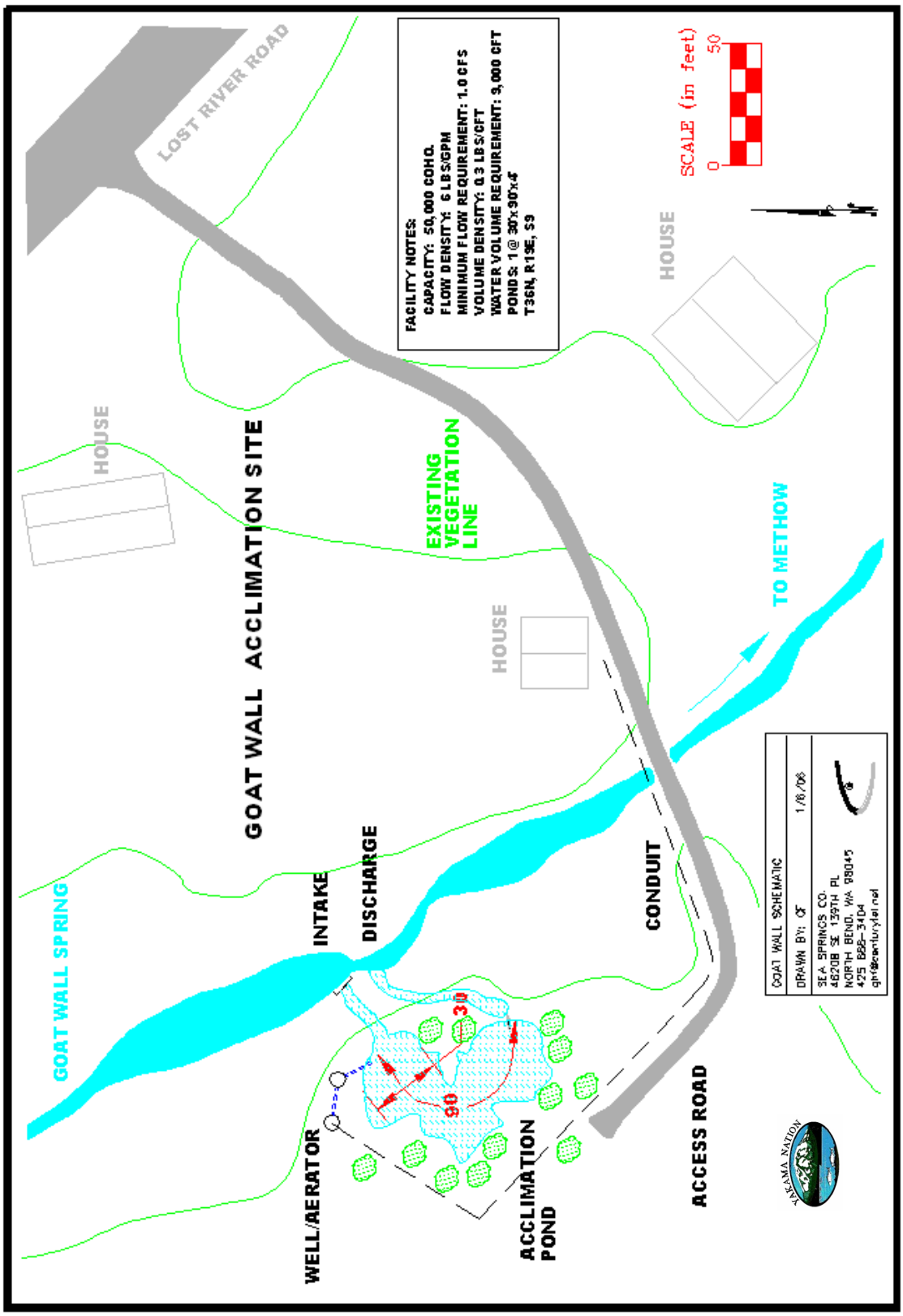

Figure 2. Goat Wall Conceptual Design

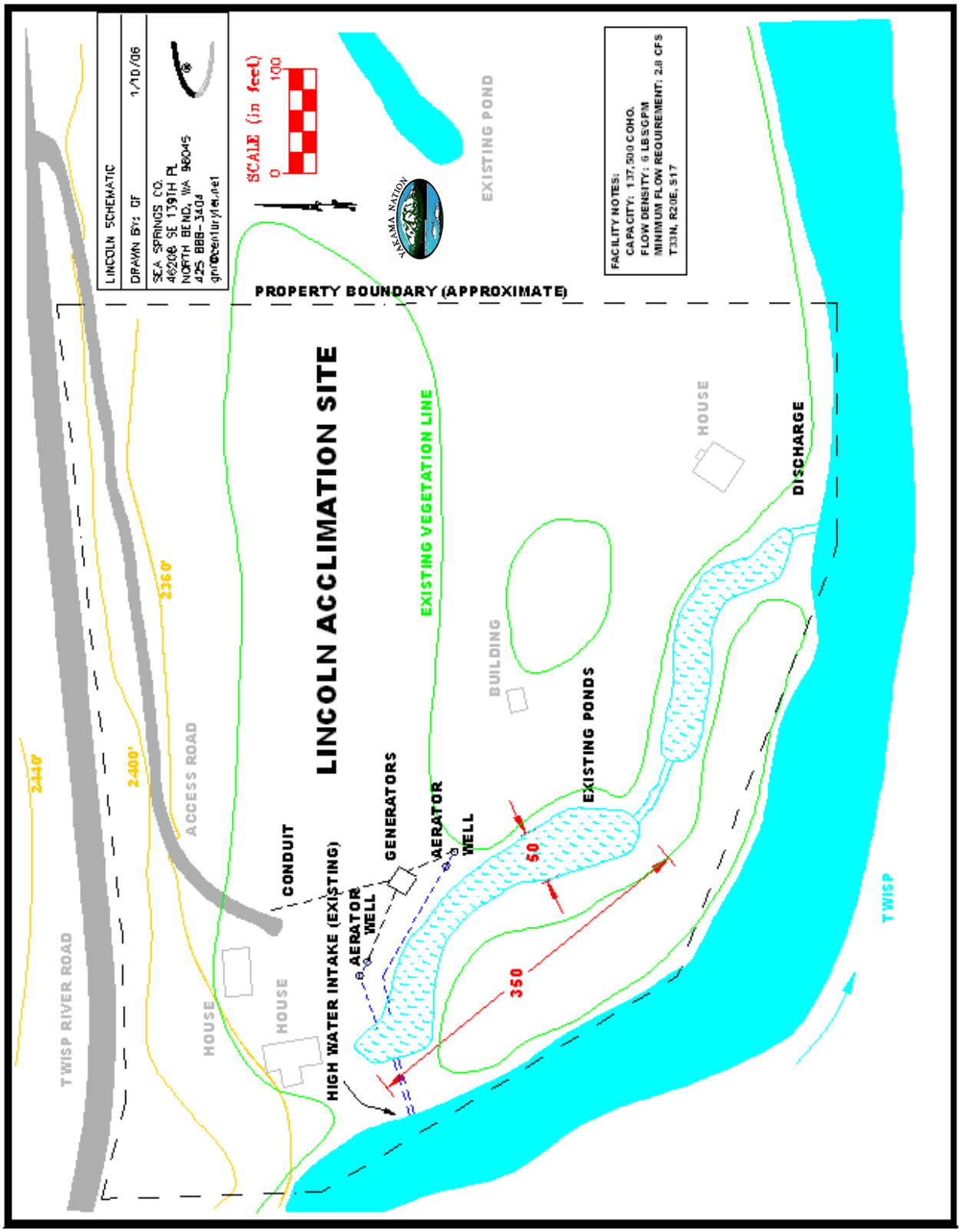

Figure 3. Lincoln Conceptual Design

III. *FACILITY CAPITAL COSTS*

Following are construction, capital equipment, permitting, and land purchase costs for the proposed acclimation sites. Table 4 summarizes these costs. All prices are 2005 dollars. Sales taxes and delivery are included in the estimated values.

Table 4. Methow Acclimation Site Capital Cost Summary

	Construction	Capital Equipment	Land Cost	Total
Lincoln	$254,183	$98,793	$0	$352,976
Goat Wall	$246,317	$25,242	$290,500	$562,060
Existing	$30,680	$0	$0	$30,680
TOTAL	**$531,180**	**$124,035**	**$290,500**	**$945,715**

A. Existing Sites

Relatively minor capital improvements are proposed for sites with existing ponds. Plans include new barrier nets for 3 sites, some road construction at the Hancock site, and improvements to the existing water intake at Biddle. Predator control measures at all the sites include stringing overhead wires and electric fences where possible. None of these existing sites will require land purchase or significant construction.

Table 5. Existing Methow Acclimation Site Capital Costs

	Net barriers	Roads ($18/ft)	Water intake	Predator Control	Fencing ($24/ft)	Unlisted items allowance (30%)	TOTAL
Ramsey	$1,000	$0	$0	$3,000	$0	$1,200	**$5,200**
Poorman	$1,000	$0	$0	$3,000	$0	$1,200	**$5,200**
Biddle	$0	$0	$5,000	$3,000	$0	$2,400	**$10,400**
Hancock	$1,000	$3,600	$0	$3,000	$0	$2,280	**$9,880**
TOTAL	**$3,000**	**$3,600**	**$5,000**	**$12,000**	**$0**	**$7,080**	**$30,680**

B. New Facilities

Table 6. Lincoln Capital Costs

LINCOLN	Description	Quan.	Units	Unit Cost	Cost	Totals
CONSTRUCTION						
SITE WORK						$ 13,390
Mobilization/demobilization	Equipment delivery, removal	1	ea	$ 10,000	$ 10,000	
Roads	Gravel access roads	190	lft	$ 18	$ 3,390	
GROUND WATER SUPPLY		2.8	cfs			$ 67,110
Well	8" diameter, 100' deep	2	ea	$ 25,000	$ 50,000	
Aeration towers	Packed columns	2	ea	$ 2,000	$ 4,000	
Piping	18" PVC SDR35, sand bedding, fittings	190	ft	$ 69	$ 13,110	
ELECTRICAL/GENERATORS						$ 24,400
Power delivery	Poles, lines to delivery power to site	1,000	ft	$ 4.90	$ 4,900	
Site electrical	Water pumps, generators, service drop, alarms	1	ls	$ 10,000	$ 10,000	
Conduit	To well	300	lft	$ 15	$ 4,500	
Alarm system	Alarms, conduit, autodialer	1	ls	$ 5,000	$ 5,000	
PONDS						$ 9,000
Outlet structures	Pre-fabricated steel, with screens	2	ea	$ 2,000	$ 4,000	
Predator net system	Supports with nets	1	ls	$5,000.00	$ 5,000	
MISC						$ 48,000
Site building	Generators, storage	400	sft	$ 120	$ 48,000	
CONSTRUCTION SUBTOTAL						**$ 161,900**
Unlisted item allowance	Contingencies	30%				$ 48,570
Contractor overhead	Construction management, profit	20%				$ 32,380
Sales tax		7.0%				$ 11,333
CONSTRUCTION SUBTOTAL						**$ 254,183**
CAPITAL EQUIPMENT						
Trailer	Office, storage, living quarters	1	ea	$ 15,000	$ 15,000	
Ground water pump, controls	Well pump, 9 hp each, sequential start, overloads	2	ea	$ 5,000	$ 10,000	
Generators	30 Kw, 48 hour fuel tank	2	ea	$ 28,000	$ 56,000	
Sales tax		7.0%			$ 17,793	
CAPITAL EQUIPMENT SUBTOTAL						**$ 98,793**
TOTAL						**$ 352,976**

KEY: LS = Lump Sum, EA = Each, LFT = Linear Feet, SFT = square feet, CFT = cubic feet, CY = Cubic Yards, MO = month, HRS = hours

Table 7. Goat Wall Capital Costs

GOAT WALL	Description	Quan.	Units	Unit Cost	Cost	Totals
CONSTRUCTION						
SITE WORK		1.0	acres			$ 33,550
Mobilization/demobilization	Equipment delivery, removal	1	ea	$ 15,000	$ 15,000	
Roads	Gravel access roads	560	lft	$ 18	$ 10,050	
Erosion Control	Silt fences, vegetation mats	1	ls	$3,500.00	$ 3,500	
Earthwork	Grub, clear, grade site	1.0	acre	$ 5,000	$ 5,000	
SURFACE WATER SUPPLY		1.0	cfs			$ 50,000
Intake screen structure	Precast concrete screen base, screens	1	ea	$ 20,000	$ 10,000	
Intake installation	Sheet pile, dewatering, structure placement	1	ea	$ 50,000	$ 40,000	
GROUND WATER SUPPLY		1.0	cfs			$ 29,440
Well	8" diameter, 100' deep	1	ea	$ 25,000	$ 25,000	
Aeration towers	Packed columns	1	ea	$ 2,000	$ 2,000	
Piping	10" PVC SDR35, sand bedding, fittings	40	ft	$ 61	$ 2,440	
ELECTRICAL/GENERATORS						$ 28,500
Site electrical	Water pumps, generators, service drop, alarms	1	ls	$ 10,000	$ 10,000	
Conduit	To surface water intake and well	900	lft	$ 15	$ 13,500	
Alarm system	Alarms, conduit, autodialer	1	ls	$ 5,000	$ 5,000	
PONDS		417	cy			$ 11,750
Pond construction	Excavate, form berms	417	cy	$ 6.60	$ 2,750	
Outlet structures	Pre-fabricated steel, with screens	2	ea	$ 2,000	$ 4,000	
Predator net system	Supports with nets	1	ls	$5,000.00	$ 5,000	
MISC						$ 3,650
Water discharge channel	Channel construction, rock	250	cy	$ 7	$ 1,750	
Overhead cover	Tree plantings	30	ea	$ 30	$ 900	
Site revegetation		1.0	acres	$ 1,000	$ 1,000	
CONSTRUCTION SUBTOTAL						**$ 156,890**
Unlisted item allowance	Contingencies	30%				$ 47,067
Contractor overhead	Construction management, profit	20%				$ 31,378
Sales tax		7.0%				$ 10,982
CONSTRUCTION SUBTOTAL						**$ 246,317**
CAPITAL EQUIPMENT						
Ground water pump, controls	Well pump, 8 hp, sequential start, overloads	1	ea	$ 5,000	$ 5,000	
Oxygen back-up system	DO sensors, liquid oxygen tank, valves, airstones	1	ea	$ 3,000	$ 3,000	
Sales tax		7.0%			$ 17,242	
CAPITAL EQUIPMENT SUBTOTAL						**$ 25,242**
LAND PURCHASE						
Real estate appraisal		1	ea	$ 5,000	$ 5,000	
Land audit	Environmental appraisal	1	ea	$ 3,000	$ 3,000	
Land purchase	Purchase from private owner	5	acre	$ 50,000	$ 250,000	
Real estate tax		13%			$ 32,500	
LAND PURCHASE SUBTOTAL						**$ 290,500**
TOTAL						**$ 562,059**

KEY: LS = Lump Sum, EA = Each, LFT = Linear Feet, SFT = square feet, CFT = cubic feet, CY = Cubic Yards, MO = month, HRS = hours

C. Basis for the Cost Estimates

In as many cases as possible, estimates for capital equipment and construction costs are based on the actual costs for recent fish facility projects completed by the MCCRP and Yakama Nation coho programs. These projects are listed in Appendix C1. In addition, the 2006 Heavy Construction Costs Estimating Software was used to confirm these costs and to produce estimates where needed.

Land costs were based on a review of recent real estate listings of property for sale in the area. Averages of values for comparable property were used to estimate the Goat Wall land costs.

IV. *PHOTOS*

Biddle.jpg

Hancock.jpg

Lincoln.jpg

Poorman.jpg

Figure 4. Group 1 Photos